

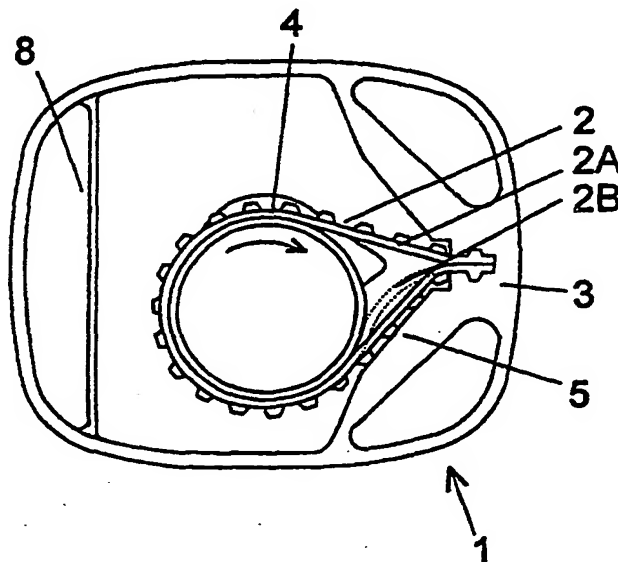
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(54) Title: BOTTLE CAP REMOVER**(57) Abstract**

An opener (1) for screw top containers comprising a housing (3) and holding means (2) (having resilient means) for engaging a peripheral edge of a screw cap fastened to said screw top container characterised in that the holding means positively grips the screw cap and defines a recess for releasably retaining the screw cap, the arrangement being such that when the device is placed on a capped container top, the cap is automatically held firm within the holding means whereby rotation of the housing with respect to the container increases the frictional torque on the screw cap and causes the container cap to be either loosened or tightened depending upon the relative direction of rotation.



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BOTTLE CAP REMOVER

The bottle cap remover (referred to from hereon as the "device") is a simple, easy to use, device which will aid persons who, for various reasons (medical or otherwise), are unable to grip firmly with their fingers, and who experience difficulty, and sometimes pain, removing small diameter screw-on plastic and metal caps from bottles. The device is particularly suitable for, but not exclusively for, the removal (and re-tightening) of near parallel sided screw caps as normally fitted to plastic bottles and glass bottles supplied for soft drinks, sauces, and medicines. A larger infinitely variable size device, using similar principles, can remove and re-tighten jar tops and also break the vacuum in vacuum packed jars and lift the tab on ring-pull cans.

A well known commercially available device for assisting removal of small bottle caps consists of a flexible conical shaped rubber moulding which fits over the cap. This device is intended to provide improved friction between the fingers and the cap, but still relies on finger pressure to achieve this friction. Many people are unable to apply this reduced finger pressure. This device is not intended to remain with the cap, to be readily available if it is desired to do so, and is generally stored at a separate location.

Another known commercially available device uses a toothed belt to wrap round the cap, with the length of the loop being varied by positioning one end of the belt into a number of teeth moulded into the side of the handle of the device. The fingers must clamp this end of the belt into the teeth in the handle while turning the device to unscrew the cap, and for persons with gripping difficulties this device can still present problems. This device acts as a lever and only operates satisfactorily in one direction, and must be turned over to operate in the opposite direction. This device does not have means provided to rest it on the cap to make belt fitting round the cap easier. The device does not remain

on the cap, but falls off as soon as the clamping is removed from the moveable belt end and it does not assist removal of push down safety caps. This device is not intended to remain with the cap, to be readily available if it is desired to do so, and is generally stored at a separate location.

Another commercially available device uses two metal levers pivoted at one end, each lever having an internal curved serrated edge section towards the pivot end (similar to a nut cracker). Placing the curved section round the cap and squeezing the levers at the open end increases the finger force applied to the cap. This device relies on reasonable finger pressure to provide grip on the cap, and is liable to slip if insufficient force is used, with the possibility of creating sharp burrs on metal caps in particular. For persons with gripping difficulties this device can still present problems. The device does not remain on the cap, but falls off as soon as the gripping is removed and it is unable to assist removal of push down safety caps. This device is not intended to remain with the cap, to be readily available if it is desired to do so, and is generally stored at a separate location.

Another type of device commercially available consists of two plates set at an angle of about 55° to each other. The inner faces of the plates are serrated to provide grip on the cap. To use this device it is necessary to push the cap into the wedge formed by the plates to generate the grip on the cap, and at the same time turn the device to unscrew the cap. This device does not automatically lock onto the cap and cannot remain on the bottle. It does not assist removal of push down safety caps.

A variation on the commercially available device described above consists of two plates set at an angle of approximately 35° to each other forming a wedge. One plate has serrations and the other is smooth. When a cap is placed into the wedge the serrations bite into the cap, and when the

device is turned anti-clockwise to unscrew the cap the cap slides into the wedge on the smooth side which in turn increases the bite on the serrated edge. The grip on the cap is increased by the turning action until the cap unscrews.

5 The device only works one way and cannot tighten the cap. The cap usually suffers slight damage also. This device is not intended to remain with, or remain on, the cap and is generally stored at a separate location. It does not greatly assist removal of push down safety caps.

10

A further variation of this commercially available device described above uses a rubber strip to replace the serrated plate. The operating action is similar to that described above.

15

Another variation of the device described above replaces the straight rubber strip by a short solid rubber cylinder. The straight smooth plate is replaced by a curved smooth plate starting close to the rubber cylinder at one end, and curving round and away from the rubber cylinder to form a "curved wedge". The operation is similar to that described above. This device is primarily made for larger cap sizes, eg jars, and does not work satisfactorily with small cap diameters and push down safety caps.

25

Another commercially available device uses a thin metal loop which is expandable in size by means of turning a long screw thread fitted inside a handle with a small knob on the end. After placing the metal loop round the cap the screw is tightened until it generates sufficient friction to enable the cap to be turned. This device is slow to use and does not have a stop plate which rests on the cap to assist in fitting the loop round the cap. It does not assist greatly in opening push down safety caps.

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According to one aspect of the present invention there is provided an opener for screw top containers comprising a housing and holding means (having resilient means) for

engaging a peripheral edge of a screw cap fastened to said screw top container characterised in that the holding means positively grips the screw cap and defines a recess for releasably retaining the screw cap, the arrangement being such that when the device is placed on a capped container top, the cap is automatically held firm within the holding means whereby rotation of the housing with respect to the container increases the frictional torque on the screw cap and causes the container cap to be either loosened or tightened depending upon the relative direction of rotation.

Embodiments of the present invention will now be described with reference to the accompanying drawings in which:

15

Figure 1 is a plan view of a small bottle cap remover according to one aspect of the present invention;

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Figure 1a is a side elevation of the bottle cap remover of Figure 1;

Figure 2 is a sectional side elevation of the bottle cap remover of Figure 1;

Figure 3 is a schematic illustration of an alternative belt fixing device;

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Figure 4 is a schematic of a plain belt construction;

Figure 5 is a schematic of a further stage of the belt construction of figure 4;

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Figure 6 is a plan view of a small bottle cap remover according to a further aspect of the present invention;

Figure 7 is a sectional side elevation of the bottle cap remover of Figure 6;

Figure 8 is a plan view of a small bottle cap remover according to a third aspect of the present invention;

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Figure 9 is a sectional side elevation of the bottle cap remover of Figure 8;

Figure 10 is a plan view of a larger variable size

bottle/jar top remover;

Figure 11 is a sectional side view of the larger variable size bottle/jar remover of figure 10.

5

A fixed size device 1, as illustrated in the type 1 drawing (Figure 1) and according to one aspect of the present invention, operates using the well known principles associated with flat belt pulley drives and band brakes. An open ended rubber, or composite rubber, reinforced belt 2 is anchored at each end, by means which will be described later, to a main body 3 forming the device 1. The belt forms a loop 4 which is specifically sized to wrap round a particular nominal diameter of bottle cap, and allows the cap to be easily inserted and removed.

15

With the device fitted onto a bottle cap and the belt 2 looped round the cap, and the bottle held fixed, then when the main body 3 is rotated, in either direction, the belt 2 (with cap inside it) initially moves slightly sideways relative to the body 3, and attempts to roll up the angled plane 5 which forms part of the body (figure 1). In performing the rolling action up the plane the leg 2A of the belt 2, on the side of the loop 4 opposite the plane 5 in which the belt is in contact, automatically tightens and increases friction between the belt and the cap, producing a torque on the cap. At this stage the friction between the cap and the bottle is maintained in equilibrium with the torque applied by the belt to the outside of the cap.

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The next stage of the action depends on the material from which the body is made which governs the friction between the body and the belt.

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When the body material produces relatively high friction between the belt 2 and plane 5 then increasing the force on the device body 3 by rotating with the hand causes the belt 2 to attempt to roll further up the plane 5, which in turn

increases the pull on the belt leg 2A opposite the plane 5 in contact with the belt, and increases the friction torque on the outside of the cap until this torque is sufficient to overcome the cap/bottle friction torque, and the cap is either
5 fully tightened or released, depending on the direction of rotation.

When the body material produces relatively low friction between the belt 2 and plane 5 then increasing the force on
10 the device body 3 by rotating with the hand causes the belt 2 to slip on plane 5 and push the non tensioned side of the belt 2B round the cap, taking up whatever slack is available which in turn depends on the diameter of the cap. In the extreme situation the two legs of the belt 2A and 2B come together,
15 one in tension and one in compression. When all the available belt slack is wrapped round the cap, the cap is firmly gripped by the belt 2 and no further slippage on plane 5 can occur. This wrapping action increases the belt grip on small diameter caps where the angle of wrap would normally decrease with
20 reduced cap diameter, which in turn would decrease the grip on the cap. Increasing the force on the device body 3 by rotating with the hand causes the belt 2 to attempt to roll further up the plane, which in turn increases the pull on the belt leg 2A opposite the plane 5 in contact with the belt, and
25 increases the friction torque on the outside of the cap until this torque is sufficient to overcome the cap/bottle friction torque, and the cap is either fully tightened or released, depending on the direction of rotation.

30 The user of the device applies much less force with the fingers than would be required without the device being fitted. This is achieved by the increased effective radius of the cap with the device fitted and the flatter faces on which the fingers apply a reduced force at a larger radius to move
35 the device. The force to generate friction on the cap to turn it is generated by the device and not by gripping with the fingers as occurs when using the round cap normally without the device.

After the cap has been tightened, or unscrewed, and the device released, the belt 2 returns to approximately its central unstressed position. When the cap has been removed from the bottle the natural non-circular pear shape of the belt 2 provides sufficient friction grip to hold the cap in the device until it is desired to screw it onto the bottle again using the device.

The top 6 of the device 1 (Figure 2) provides a stop when placing the device onto the cap and stops the belt 2 from being placed too far down the cap. A hole 7, smaller than the diameter of the cap, is provided in the top of the device so that the cap can be pushed out by a finger after the cap has been removed from the bottle, if it is desired to do so. Radial slots (not shown) extending beyond the circumference of the hole can be provided to enable the user to see more of the cap while positioning the device prior to fitting onto the cap.

In order to aid the fitting of the device onto a cap the belt 2 is held in the device 1 in a manner which forces the belt to take up a near circular, but slightly pear shape. A belt shaping plate 8, positioned across the body opposite to the anchored ends of the belt 2 can take the form of a flat face in the body, which forces the belt to take up the desired shape, but also allows sideways movement of the belt when in use.

In the main illustration shown (figures 1 and 2) the belt ends are brought together in a parallel manner, forming a loop, which makes the belt 2 take up a shape similar to a lollipop on a stick. When anchored in this manner the belt can also be a closed end circular ring, and not have two separate legs as shown in figure 1.

An alternative method of anchoring the belt (Figure 3) is to have the two ends cross over each other prior to the anchoring point. Small cut outs 9 in each end of the belt, at

the cross-over point but on opposite edges, allow this cross-over to occur. This method of anchoring the belt makes the belt loop 4 more circular in shape which in turn makes for easier fitting to, and removal from, the bottle cap.

5

A variation of the two methods of belt anchoring is to enable the piece holding the belt ends to be moved backwards or forwards by a small amount relative to the main body to adjust the effective belt length if necessary to change the usable cap size range. This adjusting piece can be moved by means of one or more screws or a rotatable eccentric.

10

The belt 2 can be either a separate component for fitting to the main body 3, or integrally moulded into the main body.

15

If a wide belt (>10mm) is used then in order to assist in removing the device from the bottle cap it may be necessary at the half way point along the length of the belt, on the non gripping side, to provide a small boss (not shown) with which to hold the end of the belt when the device is removed. When a wide belt is being used then to enable the device to be easily removed from a cap a small step will require to be provided below the flat shaping plate 8. This step projects over the boss at the centre of the belt. When the device is pulled off the cap one end of the belt is restrained by this step acting on the boss, and the diametrically opposite side is restrained by the anchoring of the belt ends in the body 3. The belt then pulls easily off the cap, using a slight rocking motion if necessary.

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The belt construction 2 is made from a suitable type of rubber with reinforcing to minimise stretch when under load. Reinforcing may be achieved with thin metal or plastic strip, natural or man-made fibres or glass fibres, and may be bonded on the outside or moulded as an integral construction. The gripping side of the belt is a plain flat rubber faced surface, but may incorporate small serrations if required. The non-gripping side of the belt may be a plain flat surface

or may incorporate small teeth of a suitable profile which assists in anchoring the belt (when a separate belt is used) and distributing the load transmitted to the cap when in contact with the inclined plane 5. The belt may also be
5 fabricated using commercially available toothed timing belts cut to length. For the alternative anchoring arrangement (figure 3) slots are stamped out when appropriate, and a boss (when required) affixed using a suitable adhesive.

10 Alternatively the belt can be a plain strip of rubber coated woven fabric. In this case the belt is formed by stapling the ends together (figure 4) and then turning the belt inside out to form an end as shown in figure 5 which can be fitted into a slot of similar profile. A fast acting
15 adhesive can be used to lock the folded end before, or while, it is being fitted into the body 3.

The main body 3 can be made from a suitable plastic, or hard rubber, injection moulding. The outer contours of the
20 two longer sides are shaped, as far as is practical, to fit comfortably into the palm of a hand with the fingers bent over one side. This permits operation with minimum finger grip, but does not affect normal finger grip operation if used.

25 Different sizes of device 1 can be moulded in different colours to aid identification.

The inclined plane 5 on which the belt rolls up may be a flat surface at a set angle, a number of joining flat surfaces
30 set at slightly different angles, a curved surface, convex or concave, which continually changes in angle, or a combination of a flat surface and curved surfaces, convex or concave, at appropriate points on the plane. The angle for the inclined plane is selected to provide a compromise between the angle of
35 wrap of the belt round the bottle cap and the amount of sideways movement when torque is applied to the device.

For the period while the bottle is in use, until the

contents are exhausted, the device 1 effectively becomes an extension of the original cap and can remain on the bottle. When the bottle is finally dispensed with the device easily lifts off and is ready to be fitted to a replacement bottle.

5

It will be appreciated that the above described device 1 converts a normal round, parallel sided, or near parallel sided, screw-on bottle cap, in the size range for which the device is designed, temporarily into a cap of larger external dimensions, of a non-round shape which is more easily rotated by the hand, and does not solely rely on friction between the device and the fingers to operate it. The device 1 also holds the existing bottle cap in the device when the cap has been removed from the bottle.

15

The device 1 considerably reduces the hand/finger grip normally required to unscrew and tighten, screw-on bottle caps by increasing the effective cap radius and eliminating the friction grip on the cap normally generated by the fingers. When necessary it can be operated using the heel of the hand with very little effort provided by the fingers. The effectively larger "cap", ie the device, is easier to handle by persons with hand deformities.

25

Furthermore, the device 1 automatically locks onto an existing bottle cap (in the correctly selected size range) when rotated in either a clockwise or anti-clockwise direction to tighten or untighten the bottle cap, without removing and turning over the device to permit reverse action. The friction grip applied to the cap increases in proportion to the force applied to the device. The axis of rotation is approximately at the centre of the device, making it easy to screw on/off, and it does not appear to act as a lever pivoting from one end only.

35

It will be understood that a small range of specific sizes can be made which will cover existing popular size plastic and metal bottle caps. Typically a bottle cap size

range from 24 mm to 34.5 mm outside diameter might require three device sizes. Each size of device can accommodate approximately a 4.5 mm range in cap size diameters. Eg 24.0 - 28.5mm diameter for a nominal 26.5mm diameter model.

5

The device 1 can be used with push down safety caps, often used on bottles containing medicines and hazardous cleaning fluids, making them very much easier to open and it can accommodate the normal production dimensional tolerances of popular size plastic and metal bottle caps.

10

Furthermore, the device 1 can be easily cleaned by washing or wiping, which is necessary to maintain hygiene.

15

Since the device 1 grips the cap uniformly round most of the circumference (84% typical) and does not damage the existing cap, this eliminates possible danger to persons handling a cap directly after the device has been used on a cap.

20

A further advantage of the device is that it helps to provide a tight cap seal when replacing a cap, and thus ensures the gas in fizzy drinks is retained, or the liquid does not leak out, and prevents young children gaining access to hazardous substances.

25

The device 1 also protects the fingers against accidental cuts from the sharp edges remaining after the bottle cap tamperproof ring has been broken.

30

Alternative methods can be used to automatically lock the device onto a bottle cap and increase the friction grip on the bottle cap in proportion to the increasing force applied to the device.

35

1. Rotating cam action illustrated in the type two drawing.

The bottle cap is inserted into a closed actuated ring 10 which has a cut out 11 at one side of the inner diameter. An

actuating bar 12, which is part of the main body 3, fits in the cut out, but just clear of the inserted cap. When the body is twisted in either direction one edge of the bar 12 contacts the cap and the opposite edge contacts the back of the cut out 11. This action pulls the opposite side of the actuating ring internal diameter in contact with the cap. As the body 3 is rotated further the cap is further squeezed between the bar and the ring, generating a friction force on the cap, and attempting to turn the cap. The friction force will continue to increase as more torque is applied to the body until the cap is released or tightened, depending on the direction of rotation.

The actuating ring 10 can be a plastic moulding, and "fingers" 13 can be included which are cantilevered and slightly protrude into the hole in the ring. These "fingers" are pushed back when the cap is inserted and provide sufficient grip to hold the cap when it has been removed from the bottle.

20

2. Rotating cam action illustrated in the type three drawing.

The bottle cap is inserted into an open ended clamping ring 14, which is almost round, but not exactly circular. This ring may be plastic or metal. The ends of the ring cross-over each other and then turn through approximately 90°. A slot is cut out in one end and the other end is narrowed down to pass through this slot. An oval shaped cam piece 16, which is part of the main body 3, fits between the two ends of the clamping ring. When the body 3 is turned in either direction the cam 16 forces the two ends of the ring apart, producing a uniform clamping force on the cap. Further rotation of the body 3 increases the clamping force until the torque applied to the cap either releases it or tightens it, depending on the direction of rotation. The slightly non-circular shape of the clamping ring 14 is sufficient to grip and hold the cap when it has been removed from the bottle.

Alternatively "fingers" can be provided to hold the cap as in the type two design.

5 An infinitely variable larger size device, illustrated in the type 4 drawing, can be made which has all the same features (including push down safety caps) but extends the principle of operation up jar sizes.

10 Based on the arrangement where the belt ends meet parallel to each other (figure 1) it is possible to construct a device 17 with a much larger size range which, as well as covering the same size range as device 1 described previously, can also include jar tops and also grip the bottle/jar body.

15 In the type 4 drawing (figure 10) of device 17 a length of reinforced belt 20 (either closed end or open end of a similar construction as described previously) is fixed, by means of a screw or rivet 26, to a small plate 18 which has a small hole positioned approximately 10mm below the fixing
20 point. A round metal bar 19, slightly smaller than the hole diameter, passes through the hole. The metal plate 18 is angled such that when it is fitted to the bar 19 the belt 20 is slightly angled upwards pressing it lightly against the top of the body 27. The elasticity of the belt 20 acts as a
25 spring which holds the plate 18 continuously at an angle on the rod 19. In this position the tilted plate 18 is always locked on the bar 19 by friction when pulled by the belt 20 in a left direction (figure 11) at the 10mm distance from the rod 19.

30

The belt loop 22 can be varied in size by sliding the plate 18 backwards and forwards along the bar 19. This can only happen when the moving force is applied at the correct point on the plate. To this end two lugs 28 are provided as
35 part of the plate. Pushing to the left (figure 11) at the bottom of the lugs tilts the plate slightly clockwise to overcome the belt 20 spring force, releasing the friction grip, and the plate 18 (and belt 20) moves to the left

increasing the size of the belt loop 22 for fitting over the cap/top (or releasing the device from the cap). Pulling to the right at the top of the lugs 18 tilts the plate slightly clockwise to overcome the belt 20 spring force, releasing the friction grip between the plate 18 and the rod 19, and the plate 18 (and belt 20) moves to the right reducing the size of the belt loop 22 to tighten round the cap/top.

When the belt loop 22 has been pulled round the cap it is automatically locked on to the cap and operates in a similar manner to the smaller device 1 described earlier. The device 17 remains double acting when turned in both directions and also holds the cap, which are the same features as the smaller device 1.

A stop plate 21 (removable) is provided which rests on the jar top to make fitting of the belt loop 22 round caps/tops easier. The stop plate 21 has a similar outer profile to the small device 1 described previously and can be held to make replacing caps/tops easier.

With the stop plate 21 removed the belt loop 22 can also be placed round the container (eg jar) and the container can also be easily gripped in the same manner as the cap. This may be required by people with severe gripping difficulties who might have to use two such devices, one for the container and one for the cap.

With, or without, the stop plate 22 removed the device 17 can assist with tying plastic refuse bags. When the top of the bag has been gathered and twisted together the belt loop 22 can be placed round the twisted end, and the belt 20 pulled back to tighten round the neck, leaving both hands free to tie the bag.

This device 17 can also incorporate other features for opening sealed containers.

The vacuum can be released in vacuum packed jars by placing the raised boss 23 on the top of a jar and pushing the small step 24 under the rim of the jar screw top. When the device 17 is levered upwards the rim is distorted slightly which is sufficient to break the vacuum making it easy to unscrew the top.

Ring pull cans can be opened by placing the small projection 25 under and into the ring of a ring pull tin, enabling the ring to be pulled by means of the device 17. This projection 25 can also be used for operations which would normally be undertaken using a finger nail, eg removing batteries, ripping open packaging etc.

It will be appreciated that the above described device 17 provides means for breaking the vacuum in vacuum packed containers, gripping and turning bottle, jar and container caps, lifting and pulling rings on ring-pull tins and tearing open other wrappings.

The device 17 is infinitely variable for fitting round a wide range of bottle and jar caps. Typically a size range from 25-100 mm can be attained.

Furthermore the mechanism for varying the size locks automatically after a change in size has been made and it is always in the locked mode until it is moved in either direction.

The device 17 can be used with push down safety caps.

The device 17 can perform many of the functions which people use their finger nails for. Eg removing batteries, opening letters, etc.

CLAIMS

- 1 An opener for screw top containers comprising a housing and holding means for engaging a peripheral edge of a screw cap fastened to said screw top container characterised in that the holding means positively grips the screw cap and defines a recess for releasably retaining the screw cap, the arrangement being such that when the device is placed on a capped container top, the cap is automatically held firm within the holding means whereby rotation of the housing with respect to the container increases the frictional torque on the screw cap and causes the container cap to be either loosened or tightened depending upon the relative direction of rotation.
- 2 An opener according to claim 1 and further comprising means for retaining the ends of the holding means in the housing.
- 3 An opener according to claim 1 or 2 wherein an aperture is provided through the housing allowing a finger to be inserted to push a screw cap out of engagement with the holding means.
- 4 An opener according to claim 1, 2 or 3 wherein reinforcing strips are provided on the outer surface of the holding means.
- 5 An opener according to any one of the preceding claims wherein the holding means is formed of a resilient material.
- 6 An opener according to claim 5 wherein the resilient material is rubber.
- 7 An opener according to any one of the preceding claims wherein the housing is formed of a rigid plastics material.
- 8 An opener according to any one of the preceding claims wherein stop means is provided within the housing to correctly

align the screw top in the housing.

9 An opener according to any one of the preceding claims
wherein means are provided for varying the length of the
5 holding means with the housing.

10 An opener according to claim 9 wherein means are provided
for locking the holding means at a particular length.

10 11 An opener according to any one of the preceding claims
wherein the holding means is integral with the housing of the
opener.

15 12 An opener according to any one of the preceding claims
wherein a projection is provided on the housing for engagement
under the rim of a vacuum sealed cap in order to deform the
cap thereby breaking the vacuum seal.

20 13 An opener for screw top containers substantially as
hereinbefore described with reference to and as shown in
Figures 1 to 5 of the accompanying drawings.

25 14 An opener for screw top containers substantially as
hereinbefore described with reference to and as shown in
Figures 6 and 7 of the accompanying drawings.

30 15 An opener for screw top containers substantially as
hereinbefore described with reference to and as shown in
Figures 8 and 9 of the accompanying drawings.

16 An opener for screw top containers substantially as
hereinbefore described with reference to and as shown in
Figures 10 and 11 of the accompanying drawings.

AMENDED CLAIMS

[received by the International Bureau on 23 October 1995 (23.10.95);
original claim 1 amended; original claim 8 cancelled;
remaining claims unchanged (2 pages)]

1 An opener for screw top containers comprising a housing
and holding means for engaging a peripheral edge of a screw
5 cap fastened to said screw top container characterised in that
the holding means positively grips the screw cap and defines a
recess for releasably retaining the screw cap, the housing
having stop means to correctly align the screw top in the
housing, the arrangement being such that when the device is
10 placed on a capped container top, the cap is automatically
held firm within the holding means whereby rotation of the
housing with respect to the container increases the frictional
torque on the screw cap and causes the container cap to be
either loosened or tightened depending upon the relative
15 direction of rotation. Without repositioning the opener on
the crew cap, the screw cap being retained within the holding
means after removal of the screw cap from the container.

2 An opener according to claim 1 and further comprising
20 means for retaining the ends of the holding means in the
housing.

3 An opener according to claim 1 or 2 wherein an aperture
is provided through the housing allowing a finger to be
25 inserted to push a screw cap out of engagement with the
holding means.

4 An opener according to claim 1, 2 or 3 wherein
reinforcing strips are provided on the outer surface of the
30 holding means.

5 An opener according to any one of the preceding claims
wherein the holding means is formed of a resilient material.

35 6 An opener according to claim 5 wherein the resilient
material is rubber.

7 An opener according to any one of the preceding claims

wherein the housing is formed of a rigid plastics material.

8 An opener according to any one of the preceding claims
5 wherein means are provided for varying the length of the
 holding means with the housing.

9 An opener according to claim 9 wherein means are provided
 for locking the holding means at a particular length.

10 10 An opener according to any one of the preceding claims
 wherein the holding means is integral with the housing of the
 opener.

11 An opener according to any one of the preceding claims
15 wherein a projection is provided on the housing for engagement
 under the rim of a vacuum sealed cap in order to deform the
 cap thereby breaking the vacuum seal.

12 An opener for screw top containers substantially as
20 hereinbefore described with reference to and as shown in
 Figures 1 to 5 of the accompanying drawings.

13 An opener for screw top containers substantially as
 hereinbefore described with reference to and as shown in
25 Figures 6 and 7 of the accompanying drawings.

14 An opener for screw top containers substantially as
 hereinbefore described with reference to and as shown in
 Figures 8 and 9 of the accompanying drawings.

30 15 An opener for screw top containers substantially as
 hereinbefore described with reference to and as shown in
 Figures 10 and 11 of the accompanying drawings.

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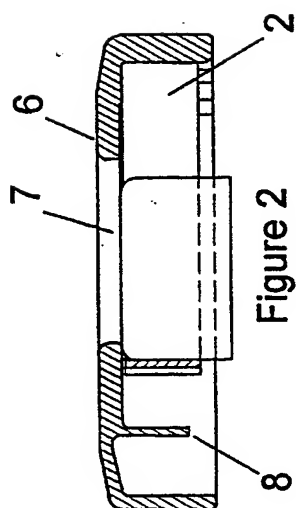


Figure 2

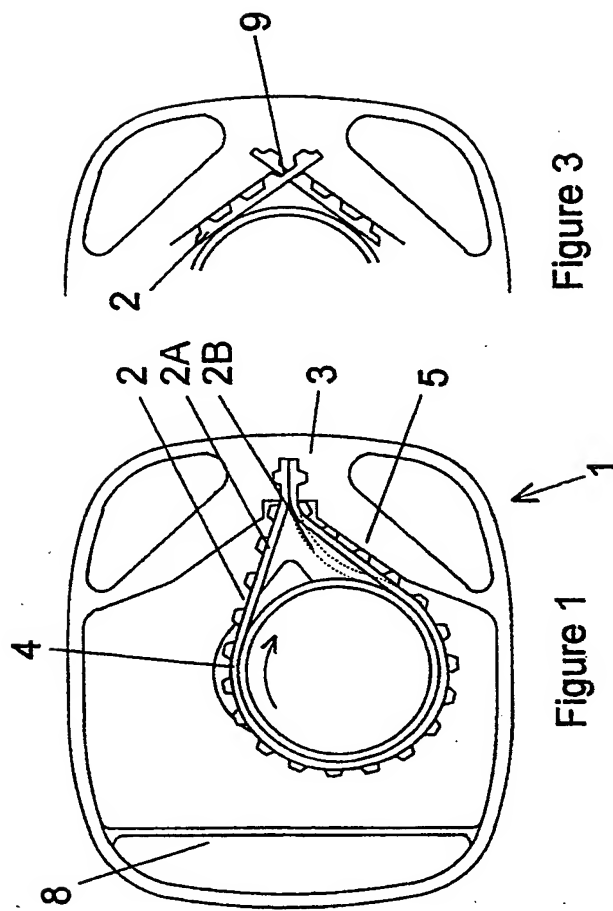


Figure 1

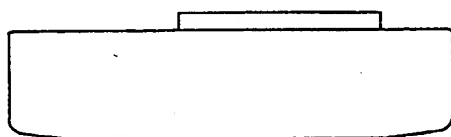


Figure 1a

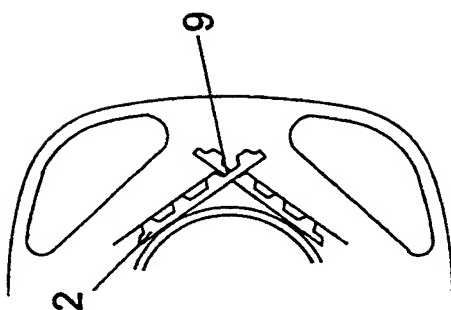


Figure 3

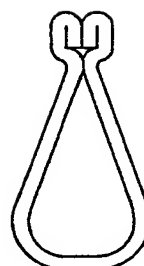


Figure 5

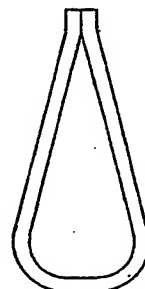
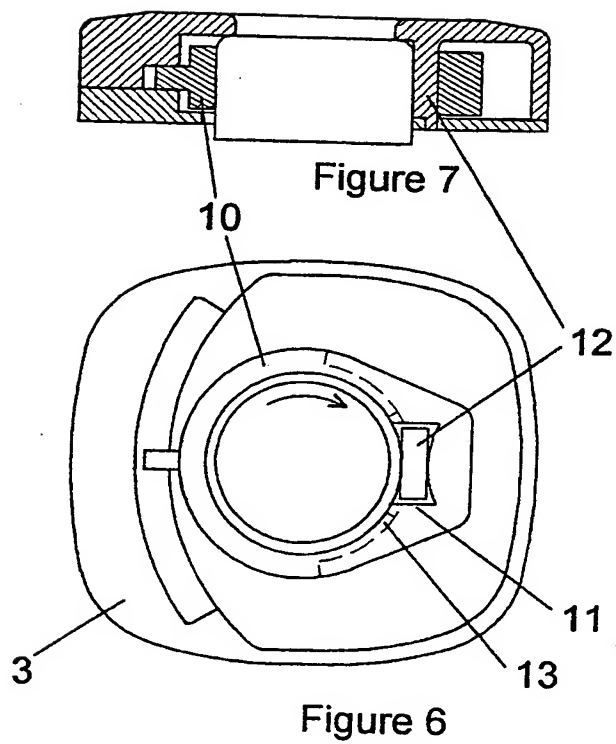


Figure 4

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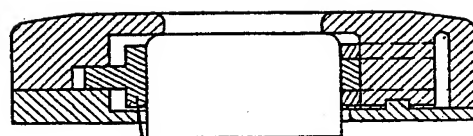


Figure 9

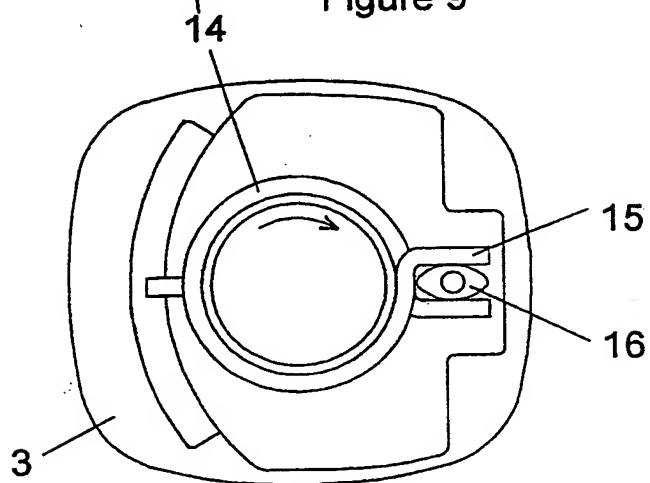
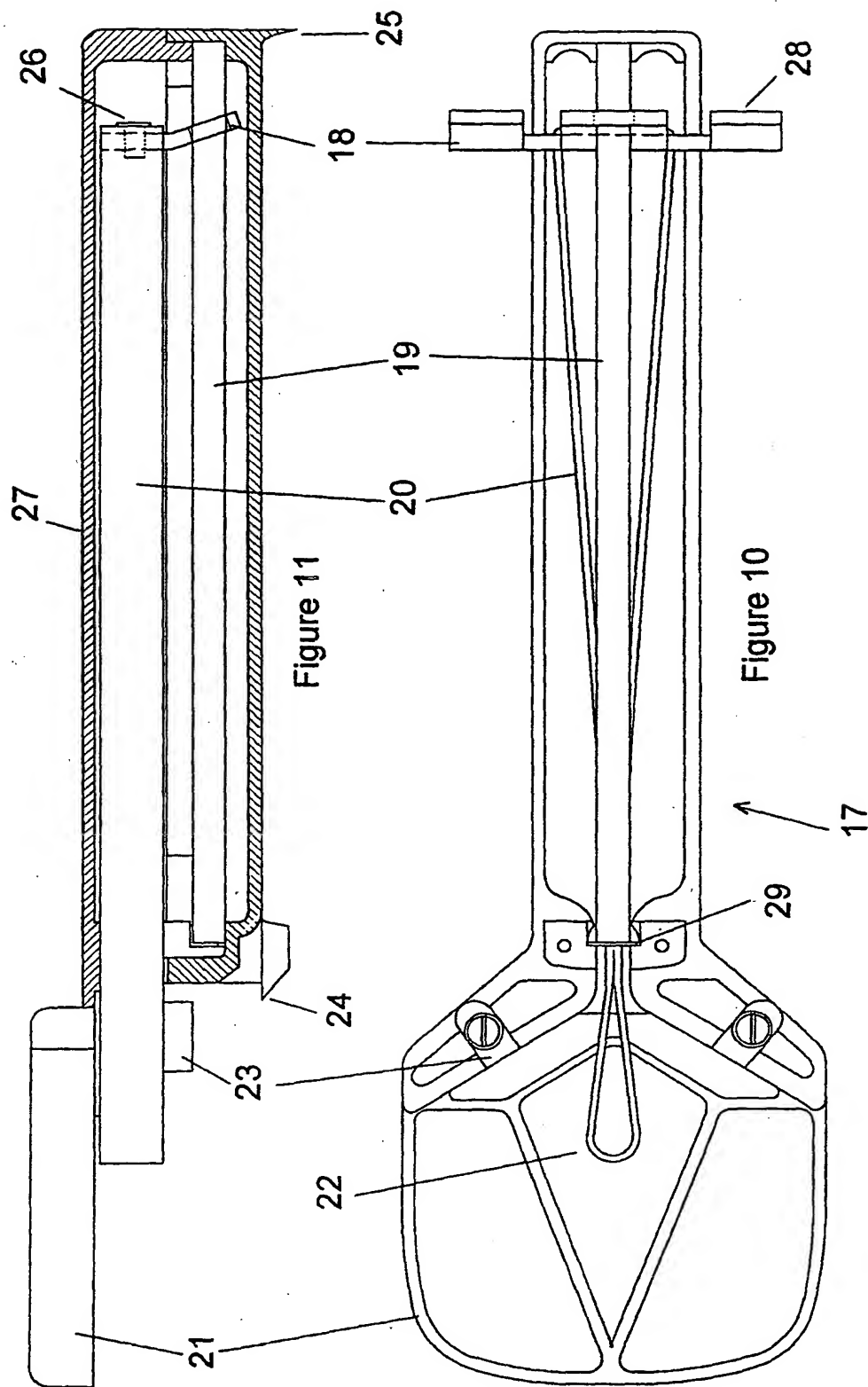


Figure 8



INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/GB 95/00981

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B67B7/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B67B B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,2 255 082 (J. FOX) 28 October 1992 see the whole document ---	1,2,5-7, 9-11
X	DE,A,28 06 530 (M. STAMPE) 23 August 1979 see the whole document ---	1,2,5,7, 9,11,12
X	US,A,5 097 729 (D. BROWN) 24 March 1992 see column 3, line 33 - column 7, line 24 see figures 1-9 ---	1,2,5,7, 9-11
X	BE,A,512 131 (P. PINKOUS ET AL.) 22 January 1954 see page 2, line 16 - line 57 see figures 1-4 ---	1,2,4-6, 9,10
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

1 August 1995

Date of mailing of the international search report

25.08.95

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Smolders, R

INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/GB 95/00981

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,4 889 018 (R. SHAFFER) 26 December 1989 see the whole document ---	1,2,4-7
X	FR,A,2 137 118 (INVENTIONS & DESIGN AGENCY LTD.) 29 December 1972 see page 5, line 11 - page 11, line 39 see figures 1-9 ---	1,2,4-6, 9
X	DE,B,26 57 887 (ACKERET DESIGN STUDIOS) 23 March 1978 see column 3, line 54 - column 5, line 14 see figures 1-7 ---	1,2,8-10
X	DE,A,19 15 025 (G. VELLGUTH) 8 October 1970 see page 4, line 16 - page 9, line 15 see figures 1-8 ---	1,2,9,10
X	US,A,4 095 492 (M. MAKELA) 20 June 1978 see column 1, line 64 - column 3, line 48 see figures 1-5 -----	1,2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 95/00981

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A-2255082	28-10-92	NONE	
DE-A-2806530	23-08-79	NONE	
US-A-5097729	24-03-92	NONE	
BE-A-512131		NONE	
US-A-4889018	26-12-89	NONE	
FR-A-2137118	29-12-72	NONE	
DE-B-2657887	23-03-78	AT-B- 354879	11-02-79
		BE-A- 861487	31-03-78
		CA-A- 1076853	06-05-80
		CH-A- 619196	15-09-80
		FR-A, B 2378715	25-08-78
		GB-A- 1565566	23-04-80
		JP-C- 1107344	30-07-82
		JP-A- 53087878	02-08-78
		JP-B- 56048391	16-11-81
		LU-A- 78364	27-01-78
		NL-A- 7714229	23-06-78
		SE-B- 418280	18-05-81
		SE-A- 7712776	22-06-78
		US-A- 4150591	24-04-79
DE-A-1915025	08-10-70	NONE	
US-A-4095492	20-06-78	NONE	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB95/00981

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 13-16
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See Rule 6.2 (a) PCT
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

